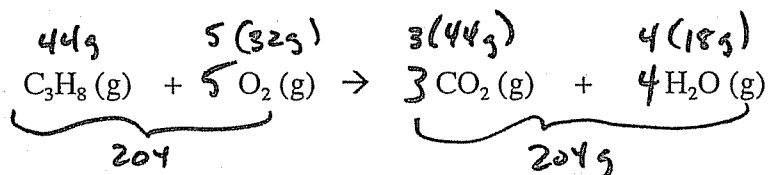


Stoichiometry Review

1. What does the law of conservation of mass state: (what should you observe about the masses if you do a reaction in the lab?)

Mass should be same before + after reaction

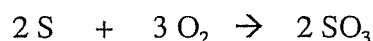
2. Prove mathematically that mass is conserved in the following **unbalanced** reaction:



If 88 g of C_3H_8 reacts, about how much CO_2 would be formed? (Estimate)

88g is 2 moles C_3H_8 so we would get
6 moles CO_2 so about 264g

3. In the following reaction:



2 atoms of S react to produce 2 molecules of SO_3 .

4 atoms of S react to produce 4 molecules of SO_3 .

2 moles of S react with 3 moles of O_2 .

1 mole of S reacts with 1.5 moles of O_2 .

6 moles of O_2 react to form 4 moles of SO_3 .

8 moles of SO_3 are formed when 8 moles of S react.

If you had 1 mole of S and 4 moles of O_2 , which reactant is limiting and which is in excess?

You would need 1.5 moles of O_2 to react 1 mole of S. You have 4 moles of O_2 which is more than enough. S is Limiting

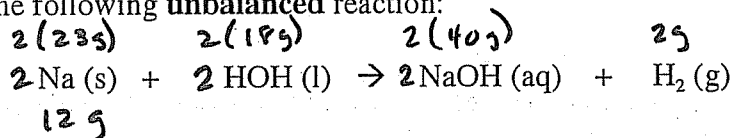
How many moles SO_3 would be produced?

1 mole of S \rightarrow 1 mole SO_3

What is significant about the limiting reactant? What happens when it runs out?

- Reaction stops. You have to use it to calculate the theoretical yield

For the following **unbalanced** reaction:



1. If 12.4g of Na reacts with excess HOH, what is the theoretical yield of NaOH?

$$\frac{2(23g)}{12g} = \frac{2(40g)}{xg \text{ NaOH}} \quad x = 20.9g$$

What was the limiting reactant here? How do you know?

Na limited. You were told excess HOH

2. If 15.2g of H₂ was produced, how many grams of HOH were reacted?

$$\frac{2g}{15.2g \text{ H}_2} = \frac{2(18g)}{xg \text{ HOH}}$$

$$x = 274g \text{ HOH}$$

3. To react 2.10g of Na, how many grams of water are needed?

$$\frac{2(23g) \text{ Na}}{2.10g \text{ Na}} = \frac{2(18g) \text{ HOH}}{xg \text{ HOH}} \quad x = 1.6g$$

If you have 50g of HOH is that enough? What is the limiting reactant?

Yes. It is more than enough
So Na runs out or is the Limiting Reactant

4. If 4.6g of Na is placed in 100g of HOH, what is the theoretical yield of NaOH?

$$\frac{2(23g) \text{ Na}}{4.6g \text{ Na}} = \frac{2(18g) \text{ HOH}}{xg} \\ x = 3.6g \text{ HOH}$$

Na limits so...

$$\frac{2(23g) \text{ Na}}{4.6g \text{ Na}} = \frac{2(40g) \text{ NaOH}}{xg \text{ NaOH}} \quad x = 8g \text{ NaOH}$$

What is the % yield if the experimental yield is 5.0g NaOH?

$$\frac{5.0g}{8.0g} \times 100 = 62.5\%$$

What would you have left over?

there is water left over